REMARKS

Applicant respectfully requests consideration of the following remarks together with the amended claims prior to the next office action.

The claims were rejected in the previous action under 35 U.S.C. § 112, second paragraph. The Examiner could not tell if claims 1 and 11 were intended to mean if the "storage devices" or if the "control signal connectors" have "different configurations." The Examiner noted his belief that there was "no basis in the specification to support a claim that the control signal connectors having different configurations."

Applicant asks the Examiner to read the specification again and reconsider his position on this point. It is in fact the very essence of Applicant's disclosure to solve the problem of having the same sled module accommodate multiple configurations of Hard Disk Drives (HDDs) or other mass storage devices that have control signal connectors in different positions.

For example, at page 1, beginning on line 6 of Applicant's specification, it is described that in a typical disk array assembly, circuit sled modules each hold one or more mass storage devices such as a Hard Disk Drive (HDD). The typical sled has a housing into which the HDD is mounted, together with a circuit board and a front panel. The ends of the sled module contain mating input/output signal connectors to connect power and data signals to the backplane of the tray. The circuit board also includes a connector that is used to carry power and data signals to and from the HDD, via a flexible cable.

As stated at page 1 line 15, however, a given sled module in the prior art cannot accommodate different brands of HDDs without the flexible cable. This is because the data and power connectors used on various brands of HDDs, while of the same type, are not all in exactly the same physical location [i.e., the same (x,y) position] on the back of the HDD housing. It is desirable that the data interface and power port on each HDD mate directly with corresponding ports on the circuit board. This would eliminate the need for a flexible cable to couple the data and power ports on the HDD device, thus reducing the size and numbers of parts of the sled module assembly.

The inventor has therefore realized it is desirable to have a circuit sled module which can accommodate HDDs with a variety of data interface and power port positions, while providing a direct connection between the HDD and the circuit board. The solution to this very problem is indeed the whole premise of the Applicant's claimed invention.

For example, the Applicant goes on to describe (beginning at page 4, line 16) that while standards have evolved that specify the width of disk drive enclosures (i.e., 3.5 inches), the exact location on the back of the HDD of the data and power connectors 40 and 42 are not standard for different manufactures of HDDs. It was stated here again that a goal of this invention is to be able to accommodate a variety of HDD port locations with the same sled module assembly.

The solution to this problem, as stated beginning at page 4, line 20, is to provide differently sized spacers 30 on either side of the HDD mounting system. It is suggested that any number of spacers, or spacers of different thicknesses can be used to set the position of the HDDs so that the end connectors 40 and 42 mate properly with the circuit board connectors 36 and 38.

The Applicant even presents an example, beginning at page 4, line 25 where an HDD of a different manufacture has ports that are shifted by a distance of three millimeters as compared to a first HDD device. In this instance, the spacers 30 were chosen with a thickness such that the HDD is itself moved physically by a distance of three millimeters (along the plane of the mounting brackets) to make up the shift in position of the rear connectors 40, 42. Thus, the spacers 30 are used to shift the physical position of the HDD with respect to its mounting hardware, thereby allowing the signal connectors to remain in a fixed position with respect to the circuit board. Thus, the sled can thereby accommodate HDDs of various brands and sizes.

As evident from Applicant's drawing, the spacers 30 are a planar sheet of material of selected thickness to accommodate the needed shift. They have several holes that align with mounting screws 48, i.e., the spacers are meant to fit through the slotted holes in the portion of the housing 8 that is used to mount the HDD in place.

Unlike other similar assemblies, therefore, no flexible cables are required to connect the HDD to the circuit board, since the ports 40, 42 on the back of the HDD can now be mated directly to the connectors 36, 38 on the circuit board 14.

It is quite clear to us therefore that there is abundant basis in the specification to support the claimed invention, and specifically to support a claim directed to the concept of a circuit sled module that can accommodate hard disk drives having control signal connectors that are of different configurations-- that is, having control signal connectors that are in positions that are different from one another. The rejection under 35 U.S.C. §112 should therefore be withdrawn.

The claims were also rejected under 35 U.S.C. §102 and §103 as being anticipated by and/or considered obvious in view of the prior art. The Examiner continues to cite Yeom *et al.*, U.S. Patent 5,327,323 stating that this patent is identical to Applicant's claimed invention.

But Yeom is directed to solving a completely different problem from the Applicant, and therefore cannot possibly be identical. Yeom is concerned with providing a guide for a removable drive that can be used in both a laptop portable computer as well as a desktop computer. Yeom recognizes that portable or laptop computer equipment typically use disk drives in a 2.5 inch width form factor, and that it would be desirable to accommodate such drives in the 3.5 inch or the 5.25 inch bays used in desktop computer systems. The bracket 1 and housing 10 in Yeom are thus directed to providing a structure that can accommodate a 2.5 inch width disk drive in a space that is 3.5 or 5.25 inches wide.

Furthermore, Yeom never shows, considers or even remotely mentions the physical position of the connector HC on the HDD and the connector 40 on the interface board 4 can be different for different HDDs. At best, all that can be said is that he assumes these two will always be manufactured in a known location on the back of the HDD and on the circuit board, respectively, so that when the removable drive is inserted in the slot, they will line up. He is in fact assuming these will always be the same.

There is no provision in Yeom for the guides 5 to be of different thicknesses for different drives, or that different drives having different rear connector HC configurations be accommodated with the same guide arrangement. This is even more clear when it is understood that the guides (walls) 5 in Yeom do not determine the spatial relationship of the connector 40 to the rest of the assembly, or over to the connector HC. That is fixed instead by the holes 51. Even if Yeom's walls 5 were made thicker or thinner, that would still not change the relative position of the connectors HC 40 with respect to the rest of the assembly. Indeed they are an integral part of the same expansion portion 50, which is also used to support the connector 40 itself in a fixed position thereto, so that the drive can be inserted and removed by an end user.

There are several features of claims 1 and 11 not found in Yeom, and thus the prior art rejection should be withdrawn.

The Examiner also cites Sherry, U.S. Patent 5,757,617 and Wakita, U.S. Patent 5,488,538 to argue that the claims are obvious. But Sherry shows no spacers at all --- just a housing 80, a circuit board 72 and an end connector 68. His disk 60 does have a signal connector 62. Sherry

also has no teaching or suggestion that drives with different connector configurations can be accommodated in the same module.

Wakita also shows a type of chassis for a mounting a disk drive within a circuit enclosure, and he does show a type of spacer 20, 30. However, these spacers 20,30 in Wakita serve an entirely different purpose than the Applicant's spacers. The problem that Wakita was faced with was to accommodate different width dimensions (W1), that is, different disk enclosure widths and locations of mounting holes L1, L2. In particular, reading Wakita at col. 2, line 2, it is suggested that

> "if the width of the electronic equipment body (frame) is larger than that of a magnetic disk drive, the spacers are used to adjust the width dimensions for attachment."

In other words, similar to Yeom, he wants to use the spacers to accommodate HDDs having different external frame widths -- but not different end connector positions.

Wakita does not recognize the problem of aligning the rear connectors, indeed he doesn't even show the HDD connectors at all. All we can presume, therefore, is that a ribbon cable is still required with Wakita, or even a device that is some contorted combination of Wakita and Sherry would also require a ribbon cable.

We note also that neither Yeom, Sherry or Wakita disclose a sled module, as claimed, for mounting an HDD in a tray.

It is apparent therefore to us that the prior art has no showing or suggestion of a sled housing that is adapted to be fit into a tray, such that the sled housing has mating connectors that engage corresponding circuit board portions, such that the housing has a front portion in which a mass storage device is secured on peripheral edges of the housing, whereby spacers are placed within the housing to select a spatial distance between the exterior portions of the disk drive and the housing, so as to set a position of a rear connector of the storage device in alignment with a connector mounted on a corresponding circuit board, which in turn allows different mass storage devices to be accommodated in the same sled.

CONCLUSION

In view of the above amendments and remarks, it is believed that all claims are patentable and in condition for allowance, and it is respectfully requested that the application be passed to issue. If the Examiner feels that a telephone conference would expedite prosecution of this case, the Examiner is invited to call the undersigned at (978) 341-0036.

Respectfully submitted,

HAMILTON, BROOK, SMITH & REYNOLDS, P.C.

By _____

David J. Thibodeau, Jr.
Registration No. : 31,671
Telephone: (978) 341-0036
Facsimile: (978) 341-0136

Concord, MA 01742-9133
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MARKED UP VERSION OF AMENDMENTS

Claim Amendments Under 37 C.F.R § 1.121(c)(1)(ii)

1. (Twice Amended) A sled module for a mass storage device comprising:

a housing;

a circuit board mounted to a portion of the housing, the circuit board having an end mounted signal connector [for control signals];

a mass storage device having an enclosure and a [control] signal connector; and

spacers positioning the mass storage device within the housing at a position juxtaposed with respect to the circuit board such that the signal [connectors] connector on the circuit board and the signal connector on the mass storage device are aligned with one another, the spacers thus permitting the sled module [to adapt] to mate with mass storage devices having [control] signal connectors with different positional configurations.

11. (Twice Amended) A method for mounting a mass storage device having an enclosure and a [control] signal connector comprising:

providing a sled module comprising a housing, a circuit board mounted to a portion of the housing, the circuit board having an end mounted signal connector [for signals];

positioning spacers within the housing such that the mass storage device, when inserted into the housing, is positioned with respect to the circuit board such that the signal [connectors] connector on the circuit board and the signal connector on the mass storage device are aligned with one another, the spacers thus permitting the sled module to [adapt to] mate with mass storage devices having control signal connectors with different positional configurations; and

inserting the mass storage device within the housing.